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#### ***Left-Hand, and Opposite-Hand Writing Features Useful as a Basis of Forming Expert Opinions of Authorship***

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*Abstract:*

*When comparing handwritten documents concerning disputed authorship, the examiner is responsible for applying a reasonable explanation to an observed significant difference\* between features as part of the forming of an expert opinion of identification. This article discusses the features attributed to the use of the left hand and the opposite- or non-dominant hand..*

\* A significant difference is defined as an observed unique feature variation that is not observed in the writer's habitual pattern in the known writing being examined.

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In an investigation involving questioned authorship, most handwriting comparisons concern the matter of whether or not the questioned and the known handwriting were written by the same person rather than the question of which hand was used.

Many factors are involved in a comprehensive examination and comparison of writing and of the formation of an expert opinion including:

1. the extent that the subject's handwriting is modified;
2. the skill and competence of the examiner;
3. the nature of the questioned document and the available material for comparison.

In forming an expert opinion regarding authorship, the subject writer's use of the unaccustomed hand for writing, whether ambidextrous or not, is considered as a reasonable explanation for significant differences between comparable features (Alford, Edwin F., Jr., "Disguised handwriting: A statistical survey of how handwriting is most frequently disguised." Journal of

Forensic Sciences, 15:476-88, Oct 1970). The significant differences, along with the appropriate reasonable explanation, can be clearly demonstrated to the fact finder and supported by research, as reported herein and elsewhere.

Adult writers are generally more proficient with one hand than with the other. According to F.E. Dreifuss, in his article "Diagnosis and treatment of incomplete cerebral dominance" (Journal of the American Medical Association/JAMA, 206: 141, 1968), the ratio of right- to left-handed individuals is 7:1. A child will usually be either right- or left-handed by 18 months of age. The hand used commonly for manual tasks may or may not be the hand preferred for writing.

In forming an expert opinion of common authorship, the examiner considers whether or not a questioned writing is the product of a naturally, or circumstantially left-handed writer, or an attempt by a subject writer to conceal his/her identity by using the non-dominant left hand. Opposite-hand writing as discussed by Viola Stevens is based on her research of over 4000 specimens of handwriting. (Stevens, Viola. "Characteristics of 200 awkward-hand signatures." International Criminal Police Review. 237:130-7, April 1970). From an examination of pairs of specimens of two-handed writers, it was found that, in every pair, one specimen was vastly superior to the other in quality. Furthermore, she found that both right-hand and left-hand writers changed to vertical slant when using the opposite hand.

In his study of American and Israeli left- and right-handed writers, Shanon reports that the features in the handwriting of foreign scripts, such as Hebrew or Chinese which are written either from right to left or vertically, are observed as features similar to the left-hand writer and the ambidextrous (Shanon, Benny. Graphological patterns as a function of handedness and culture. *Neuropsychologia*. 17:457-65, 1979).

Dawson reports, in his study comparing right-hand writers writing with their left hand, that the primary difference between the writings was observed in the writer's skill of execution; whereas, the spacing between letters, words, and lines remained proportionally the same. (Dawson, Greg A. Brain function and writing with the unaccustomed left hand. *Journal of Forensic Sciences*. 30:167-71, Jan. 1985).

The following list of traits having significance indicating a person is writing naturally with his or her left hand, or a right-hand writer writing with the unaccustomed left hand is a composite of traits resulting from research reported in the articles annotated and listed in "The Annotated Bibliography: Left-Hand and Opposite-Hand Writing Features Useful as a Basis of Forming Expert Opinions of Authorship" compiled by Jacqueline A. Joseph. (National Association of Document Examiners Journal. Sept. 2004.)

**Traits having significance indicating a person is a left-handed writer:**

- Crossing of the lower case t from right to left.
- Leftward drag of elongated i-dots.
- Long initial stroke of letters at the beginning of a word which may proceed either in an upward or downward direction.
- Hooks and curves at the beginning of some small and capital letters which commence in a leftward direction.
- Prominent eyelets in beginning part of the small a, d and g, representing an initial underhand motion.
- Overhand motion in forming lower case v (made with retrace or eyelet at bottom) and the lower case h (eyelet formed where loop and hump are joined).
- Tenting of lower case h, l, and t; and tenting of the upper part of capital i and j.
- Open lower part of the final lower case g and y with the ending stroke curving to the left; also triangular or v-shaped lower parts of those letters.
- Absence of terminal endings of such letters as lower case d, l, and t, as well as lower case h, m, and n, with slight pen drags to the left.
- The terminal of the lower case s with an absence of a retraced bottom coupled with a leftward extension of the closing part.
- Similar to the lower case s, the lower case f and k, as well as capital G, also are found to have considerable leftward extension in their closings.

**Traits having significance indicating a person is writing with his or her opposite hand:**

- Upright slant.
- The t crossings may be crooked and wandering.
- The flat top r (See Figure 1).



*Figure 1: The flat top r*

- The flat top rather than rounded upper loops.

- The d and t may be unlooped or tent-shaped with wide bottoms (See Figure 2).



Figure 2: The tent-shaped t

- Acute angles in connecting strokes.
- The g, j, and y have flattened bottom loops.
- Dragging terminal strokes.
- Low level of skill of execution and uncertain movements (See Figure 3).

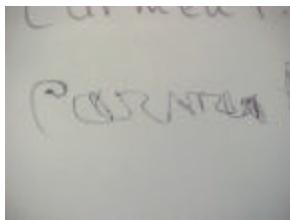


Figure 3: Uncertain movements

- Fine tremor and lack of smoothness in line quality. (See Figure 4)



Figure 4: Fine tremor

- Abrupt directional changes. (See Figure 5)



Figure 5: Abrupt changes in direction

The examiner considers that questioned handwriting having an unnatural appearance may or may not have been written by someone using the left hand, or the unaccustomed opposite hand. Some features of opposite-hand writing are also observed in the writing of the ordinarily unskilled writer. Furthermore, contrary to some views that left-handed writers are less skillful than right-handed writers, in his study, Stangoehr reported no remarkable skill difference between the two groups (Stangoehr, Gordon R. "Opposite-hand writings." Journal of Forensic Sciences. 13:376-89, July 1968.). This justifies the need to do a thorough, comprehensive and exhaustive investigation

comparing all available information and exemplars (especially the opposite-hand requested exemplar, if possible).

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